

## CASE STUDY

# Protecting Reverse Osmosis via Membrane Pre-Treatment System

**Customer:** Major Petrochemical Facility

**Location:** Midwest, USA

### APPLICATION:

Removal of low levels of organics and contaminants ahead of Reverse Osmosis System

### Objectives of the Treatment

- To protect the R.O. membrane from oil fouling by removing the inlet water concentration of 5 ppm of oil and grease to less than 1 ppm

### Key metrics

- Inlet less than 5 ppm of oil (both light and heavy)
- Outlet is less than 0.3 ppm
- Flow Rate: 400 m<sup>3</sup>/hr

**Contact/ Reference:** Upon request



### MYCELX DELIVERED:

**Greater understanding of the water contamination issues**

**Increased flow rate through R.O**

**Reduced unplanned downtime**

**Mobile Treatment Option**

**Low cost solution, no additional capex**

## CHALLENGE

The inlet water to the R.O. unit contained trace amounts of hydrocarbons that foul the membranes that were designed to operate at 400 m<sup>3</sup>/hr. The flow through the membrane reduced to 150 m<sup>3</sup>/hr within two months of commissioning because of level of hydrocarbon fouling. The standard testing methods and protocols adapted to determine the concentration and type of oil that was fouling the R.O. produced inconclusive results leading the end user to believe oil contamination was not the source of the reduced flow through the membrane.

The challenge was multi-faceted. First, identify and characterize the oil type that was present in the water. Secondly, quantify the loading that was feeding into the R.O. system and causing the reduced flow. An additional consideration was that water in this kind of petrochemical facility can be contaminated with a unique mixture of low level hydrocarbons not only from the higher range oils but also from the lighter to soluble range oils, depending on the location of the process where the oil and hydrocarbons are coming into the water stream.

## SOLUTION

MYCELX utilized its unique characterization technique to identify the hydrocarbons in the water and was able to calculate the amount of loading of oil contamination on the R.O. membrane during the pilot stage.

Once the hydrocarbons were characterized and quantified, MYCELX proposed a solution that included a multi-stage mobile polisher system specifically configured to be easily moved from location to location.

The multi-stage polisher system uses different types of filters in each stage that have strong chemical cohesion properties designed to remove the very low concentrations of oil and hydrocarbons in the water.



## IMPACT

- Oil and grease treated to less than 0.3 ppm
- No appreciable concentration of hydrocarbons reaching the R.O. resulting in increased flow rate and decreased down time
- Low cost to treat
- Polisher system housed in mobile trailer that could be moved around the plant
- Utilizing the proprietary characterization technique, end user had definitive proof of contaminant loading on the R.O. membrane

